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54. [Title of the Invention]: **Automatic Document Conveyance Device**

57. [Abstract]:

[Object]

The goal of the present invention is to provide an automatic document conveyance device capable of removing jammed paper sheets from a conveyance path using a simple operation and removing

jammed paper sheets using a simple and inexpensive configuration.

[Means for Solution]

After opening a main body cover 23 and releasing the pressurization of a paper feeding belt 11, a holding member 22 is moved to a release position to press on a support member 26 using the holding member 22, and the support member 26 is moved in the direction opposite to the pressurization against the energizing force of a coil spring 27.

Claims

[Claim 1]

An automatic document conveyance device characterized by having a separation means which separates a document into individual sheets from a stack of documents placed on a document placement bed, and a conveyance means which conveys a document separated by said separation means towards a reading location,

wherein said separation means comprises a separation unit that includes a loading member that feeds the document placed on said document placement bed; a paper feeding belt that moves the document in the paper feeding direction so that the document path lies between the loading member and the paper feeding belt; a blocking member that slides while in contact with said paper feeding belt and that moves in a direction that blocks feeding of the document; and a holding member that holds said loading member while also moving freely between the pressurizing position that pressurizes said paper feeding belt on said blocking member and the release position that releases the pressurization, and said conveyance means comprises a pair of conveyance members lying opposite to each other that move in the document conveyance direction with the document conveyance path between them, wherein the automatic document conveyance device is equipped with:

a main body cover that is provided to open and close freely on the main body of said automatic document conveyance device so as to expose to the outside and close off said separation unit and conveyance means, and when closed off, moves said holding member to said pressurizing position while also pressurizing said paper feeding belt in the direction of said blocking member;

a support member that supports one of said pair of conveyance members; and

an energizing member that energizes said support member so as to pressurize one of said pair of conveyance members against the other of said conveyance members; and

wherein when said main body cover is moved to the open position and said holding member is moved to the release position, by having said support member pressed by said holding member, said support member is moved in the direction opposite to the pressurizing direction against the energizing force of said energizing member.

[Claim 2]

The automatic document conveyance device of claim 1, wherein a linking member is provided that links said main body cover and said holding member, and when opening said main body cover, said holding member is moved to a release position via said linking member.

Detailed Description of the Invention

[0001]

[Industrial Field of Application]

The present invention relates to an automatic document conveyance device provided in copy machines, fax devices, scanning devices, and composite machines, etc., and more specifically relates to an automatic document conveyance device that can automatically separate sheets individually from a document stack and then convey this to a reading location.

[0002]

[Prior Art]

For the automatic document conveyance devices provided in the past in copy machines, fax devices, scanning devices, and composite machines, etc. (hereafter simply called "ADF"), a separation means was provided that separated one sheet of the document at a time from a document stack and conveyed this to the reading location, and known examples of this separation means include means such as one that comprises a paper feeding belt that moves a document around in the paper feeding direction and a separation roller that slides in contact with this paper feeding belt and rotates in a direction that blocks paper feeding of the document.

[0003]

However, to perform separation of the document reliably, it is necessary that one of either the paper feeding belt or the separation roller be pressurized against the other of either the paper feeding belt or the separation roller, and as an example of this pressurization method, a cover is attached to the ADF main body to remove jammed paper that got jammed in the conveyance path, and the paper feeding belt is pressurized on the separation roller using the cover when the cover is closed.

[0004]

Meanwhile, when a document gets jammed in the conveyance path, it is necessary to open the cover and release the pressurization force of the paper feeding belt.

[0005]

At this time, by simply releasing the pressurization of the paper feeding belt, a gap for removing the jammed paper in the conveyance path is not created between the paper feeding belt and the separation roller, so an attraction means such as a magnet is provided on the cover, while at the same time an attraction means such as a magnet is provided also on the paper feeding belt unit that holds the paper feeding belt, and by the magnets performing attraction to each other along with the cover opening operation, the paper feeding belt is attracted to the cover, and this ensures a gap for removing the jammed paper in the conveyance path between the paper feeding belt and the separation roller (as a prior example of this, see Unexamined Patent No. 9-218543).

[0006]

[Problems that the Invention Is to Solve]

However, this kind of prior ADF had a structure that ensured a gap between the paper feeding belt and the separation roller when removing jammed paper. Actually, a pair of conveyance rollers, etc. for conveying the document separated by the separation means to a reading location such as contact glass is provided on both sides of the conveyance path, so it is necessary to separate this pair of conveyance rollers, but nothing is said at all about this pair of conveyance rollers, and great added pressure would be applied to the document by the pair of conveyance rollers when removing jammed paper, so it is conceivable that the document would be damaged.

[0007]

Also, to separate the pair of conveyance rollers and ensure a gap in the conveyance path, it is necessary to have an independent structure that separates the pair of conveyance rollers, and the part needed for this structure makes the structure that much more complex, which causes the problem of increasing the ADF manufacturing cost.

[0008]

In light of this, the present invention's goal is to provide an automatic document conveyance device which can remove jammed paper from a conveyance path with a simple operation and that can remove the jammed paper using a simple, inexpensive structure.

[0009]

[Means Used to Solve the Problems]

To solve the problems noted above, the first invention is an automatic document conveyance device characterized by having a separation means which separates a document into individual sheets from a stack of documents placed on a document placement bed, and a conveyance means which conveys a document separated by said separation means towards a reading location, wherein said separation

means comprises a separation unit that includes a loading member that feeds the document placed on said document placement bed; a paper feeding belt that moves the document in the paper feeding direction so that the document path lies between the loading member and the paper feeding belt; a blocking member that slides while in contact with said paper feeding belt and that moves in a direction that blocks feeding of the document; and a holding member that holds said loading member while also moving freely between the pressurizing position that pressurizes said paper feeding belt on said blocking member and the release position that releases the pressurization; said conveyance means comprises a pair of conveyance members lying opposite to each other that move in the document conveyance direction with the document conveyance path between them, wherein the automatic document conveyance device is equipped with: a main body cover that is provided to open and close freely on the main body of said automatic document conveyance device so as to expose to the outside and close off said separation unit and conveyance means, and when closed off, moves said holding member to said pressurizing position while also pressurizing said paper feeding belt in the direction of said blocking member; a support member that supports one of said pair of conveyance members; and an energizing member that energizes said support member so as to pressurize one of said pair of conveyance members against the other of said conveyance members, and wherein when said main body cover is moved to the open position and said holding member is moved to the release position, by having said support member pressed by said holding member, said support member is moved in the direction opposite to the pressurizing direction against the energizing force of said energizing member.

[0010]

In this case, after opening the main body cover and releasing the pressurization of the paper feeding belt, by moving the holding member to a release position and pressing the support member using the holding member, it is possible to move the support member in a direction opposite to the pressurization direction against the energizing force of the energizing member, so that it is possible to ensure a gap in the conveyance path by separating the pair of conveyance members.

[0011]

In this way, by moving the holding member to the separation position, it is possible to simultaneously perform release of the pressurization of the separation means and to release pressurization of the conveyance means, so the jammed paper can be removed with a simple operation.

[0012]

It is also possible to remove jammed paper with a simple, inexpensive structure that adds a support member to an existing holding member that holds the loading member.

[0013]

To solve the problems noted above, the second invention is characterized by having a linking member provided that links said main body cover and said holding member, and when opening said main body cover, said holding member is moved to a release position via said linking member.

[0014]

In this case, it is possible to release the pressurization of the separation means and the conveyance means together with the operation of opening the main body cover, so it is possible to remove the jammed paper with a simple operation.

[0015]

[Working Example]

Following, we will explain a working example based on the figures.

[0016]

Figures 1 through 4 are figures that show a working example of the automatic document conveyance device of the present invention.

[0017]

First, we will explain the structure. Figure 1 shows the main body of an image-forming device 1 such as a copy machine, fax device, scanning device, or composite machine, etc., and provided on the top surface of this main body are contact glass 2a and slit glass 2b, which has a smaller area than contact glass 2a.

[0018]

Also, ADF 3 is provided on the upper part of main body 1, and this ADF 3 can be freely opened and closed to open and close off contact glass 2a via a hinge mechanism (shown by code 31 in figure 4(b)).

[0019]

ADF 3 is also formed from document tray (document placement bed) 4, separation means 5, conveyance means 6, paper discharge means 7 and paper discharge tray 8.

[0020]

Document tray 4 is made such that document stack P comprising multiple documents is placed on it, and this document stack P is separated into single sheets by separation means 5.

[0021]

Separation means 5 comprises blockage plate 9, loading roller (loading member) 10, paper feeding belt 11, and separation roller (blocking member) 12.

[0022]

By having the leading edge of document stack P bump against blockage plate 9, the leading edge of document stack P is aligned and at the same time, blockage plate 9 also prevents penetration of document stack P to the separation means 5 side, and this is moved between the position that contacts the leading edge of document stack P and the separation position by the blockage solenoid (not illustrated).

[0023]

Loading roller 10 is provided to be able to move between the position that contacts the top side of document stack P and the separation position by a loading solenoid (not illustrated), and when the loading solenoid is driven by a paper feeding start signal from main body 1, loading is done, and this is moved from the separation position to the contact position [*according to the type and level*],¹ and the document positioned at the top of document stack P undergoes paper feeding. At this time, the blockage solenoid is also driven and blockage plate 9 is separated from the leading edge of document stack P.

[0024]

Paper feeding belt 11 is wound on driving roller 11a and driven roller 11b, and as driving roller 11a is driven in the clockwise direction by a paper feeding motor (not illustrated) during document separation, there is a circular movement in the clockwise direction. Separation roller 12 slides in contact with paper feeding belt 11, and is rotationally driven in the clockwise direction by a paper feeding motor. As a result, only the topmost document is separated from document stack P.

¹ Translator's note: there may be a typographical error in the Japanese document. This probably should read "by a loading solenoid".

[0025]

Also, conveyance means 6 is formed from driving roller 13 and driven roller 14 that slides in contact with driving roller 13, and this tightly holds the document separated by separation means 5 and conveys the document to slit glass (reading location) 2b.

[0026]

Inside main body 1 underneath slit glass 2b is suspended a reading optical system (not illustrated) that includes items such as a light source, reflective mirror, converging lens, and CCD, and for the document transmitted through slit glass 2b, the document surface is read by the reading optical system.

[0027]

Moreover, to place the document on contact glass 2a and read the document, the document surface is read by moving the reading optical system to the left and right under contact glass 2a in figure 1.

[0028]

Paper discharge means 7 is formed from first paper discharge roller pair 15 and second paper discharge roller pair 16, and documents transmitted through slit glass 2b is held tightly by first and second paper discharge roller pairs 15 and 16 so that paper is discharged on paper discharge tray 8.

[0029]

Meanwhile, as shown in figures 2 and 3, paper feeding belt 11 is attached to belt holder 21, and one end of this belt holder 21 is attached to the roller axis of driving roller 11a while it also has a notch 21a, and the driven axis of driven roller 11b is inserted in notch 21a. A coil spring (not illustrated) is provided inside notch 21a, and by pressing driven roller 11b using this coil spring in a direction separated from driving roller 11a, tensile force is applied to paper feeding belt 11.

[0030]

Also, one end of holding member 22 is attached to be able to toggle freely on the roller axis of driving roller 11, and loading roller 10 is attached to rotate freely to the other end of this holding member 22. Then, so as to cover paper feeding belt 11, on this holding member 22, paper feeding belt 11a is made to toggle between the pressurization position that pressurizes separation roller 12 (position in figure 2) and the release position that separates upward from paper feeding belt 11 to release the pressurization of paper feeding belt 11 (position in figure 3).²

² Translator's note: the meaning of this sentence is not very clear in the original.

[0031]

In this working example, the loading roller 10, paper feeding belt 11, separation roller 12, belt holder 21, and holding member 22 form the separation unit.

[0032]

Also, main body cover 23 is provided on main body 3a of ADF 3; this main body cover 23 rotates freely around rotation axis 25, and is made to open and close main body 3a to expose and close off the separation unit and conveyance means 6.

[0033]

Projection 23a is provided on main body cover 23, and when main body cover 23 closes off main body 3a by projection 23a pressing belt holder 21, paper feeding belt 11 pressurizes separation roller 12, and separation pressure is generated on paper feeding belt 11 and separation roller 12.

[0034]

Also, main body cover 23 and holding member 22 are linked by band member (linking member) 24, and this band member 24 is attached to main body cover 23 and holding member 22 by snap rings 24a and 24b, respectively.

[0035]

When main body cover 23 closes off main body 3a, this band member 24 is folded so as not to interfere with the surrounding members and housed within main body 3a, and when main body cover 3 is opened, holding member 22 is made to move around to the release position.

[0036]

Also, a support member 26 is provided so as to rotate freely on rotational axis 25, and driven roller 14 is provided to rotate freely on this support member 26. Also, a coil spring (energizing member) 27 like that shown in figure 3(b) is wound on rotational axis 25, and the tip of this coil spring 27 presses support member 26 so as to pressurize driven roller 14 on driving roller 13.

[0037]

Meanwhile, the tip of support member 26 is extended close to holding member 22, and when holding member 22 is moved to the release position, by holding member 22 pressing support member 26, support member 26 is moved in the direction opposite to the pressurization direction of driven roller 14 against the energizing force of coil spring 27.

[0038]

Next, we will explain the effects.

[0039]

In this working example, a document conveyance path is formed between paper feeding belt 11 and separation roller 12 and between driving roller 13 and driven roller 14. Then, when main body cover 23 is closed, belt holder 21 is pressed by projection 23a, and paper feeding belt 11 pressurizes separation roller 12 to generate separation pressure, while at the same time, coil spring 27 presses support member 26 and pressurizes driven roller 14 on driving roller 13 to generate conveyance pressure.

[0040]

Here, when a document jam occurs in the document conveyance path, there is a display that indicates there is a jam on a display unit (not illustrated), so the user opens main body cover 23 as shown in figure 4(a). At this time, the pressure of belt holder 21 by cover 23 is released, and at the same time the band member 24 that is folded and housed within main body 3a opens up, and this band member 24 causes holding member 22 to be pulled so that holding member 22 is toggled to the release position.

[0041]

At this time, by holding member 22 pressing support member 26, support member 26 moves in the opposite direction to the pressurization direction of driven roller 14 against the energizing force of coil spring 27. As a result, the pressurization of paper feeding belt 11 and separation roller 12 and the pressurization of driving roller 13 and driven roller 14 are released simultaneously.

[0042]

Next, as shown in figure 4(b), after moving ADF 3 to the open position using hinge mechanism 31, by removing white plate 32 that covers contact glass 2a, the driven roller 14 on the bottom side of ADF 3 is exposed and jammed paper is removed from the conveyance path as shown in figure 4(c).

[0043]

Thus, in this working example, after opening main body cover 23 and releasing the pressurization of paper supply belt 11, by moving holding member 22 to the release position and having support member 26 pressed by holding member 22, it is possible to move support member 26 in the opposite direction to the pressurization direction against the energizing force of coil spring 27, so it is possible

to simultaneously release the pressurization of separation means 5 and the pressurization of conveyance means 6, allowing removal of jammed paper with a simple operation.

[0044]

It is also possible to remove jammed paper using a simple, inexpensive structure of adding a support member 26 to existing belt holder 21 that holds loading roller 10.

[0045]

Also, because main body cover 23 and holding member 22 are linked by band member 24, when main body cover 23 is opened, it is possible to move holding member 22 to the release position using band member 23.³ Because of this, it is possible to release the pressurization of separation means 5 and conveyance means 6 together with the operation of opening main body cover 23, which allows removal of jammed paper with a simpler operation.

[0046]

[Effects of the Invention]

With the present invention, by moving a holding member so as to be moved to a separation position, it is possible to simultaneously release the pressurization of the separation means and to release the pressurization of the conveyance means, so jammed paper can be removed with a simple operation. Jammed paper can also be removed by a simple, inexpensive structure whereby a support member is added to an existing holding member that holds the loading member.

[0047]

Also, because a linking member that links the main body cover and the holding member is provided, and the holding member is moved to a release position via the linking member when the main body cover is opened, it is possible to release the pressurization of the separation means and the conveyance means along with the operation of opening the main body cover, so that jammed paper can be removed with an easier operation.

[Brief Explanation of the Drawings]

Figure 1 is a schematic block diagram showing a working example of the automatic document conveyance device of the present invention.

³ Translator's note: sic; should be 24.

Figure 2 is a schematic diagram of a separation means and conveyance means when the main body cover of the working example is closed.

Figure 3(a) is a schematic diagram of a separation means and conveyance means when the main body cover of the working example is open, and 3(b) is a block diagram of the coil spring that pressurizes the support member.

Figure 4 shows the procedure for removing jammed paper in the working example.

[Explanation of Codes]

- 3 Automatic document conveyance device
- 4 Document tray (document placement bed)
- 5 Separation means
- 6 Conveyance means
- 10 Loading roller (loading member, separation unit)
- 11 Paper feeding belt (separation unit)
- 12 Separation roller (separation unit)
- 13 Driving roller
- 14 Driven roller
- 21 Belt holder (separation unit)
- 22 Holding member (separation unit)
- 24 Band member (linking member)
- 26 Support member
- 27 Coil spring (energizing member)

Figure 1

Figure 2

Figure 3

Figure 4

Continued from the front page

F terms (reference)

2H706 AA58 BA17 BA24 BA48 BA49
BA52

3F049 CA01 CA33 DA12 DB02 DB04
LA02 LB02

3F343 FA03 FB02 FB03 FC01 FC05
GA01 GB01 GC01 GD01 HA07
HA12 JA35 JD04 JD10 JD33
KB04 KB05 KB06 LA04 LA15
LA16 LB08 LC11 LC12 LD10

5C062 AA05 AB17 AB29 AD02 AD06
BA00

作に伴って分離手段５および搬送手段６の加圧を解除することができ、より簡単な操作でジャム紙を除去することができる。

【0046】

【発明の効果】本発明によれば、保持部材を離隔位置に移動させるように移動させることにより、分離手段の加圧の解除と搬送手段の加圧の解除を同時に行なうことができるため、簡単な操作でジャム紙を除去することができる。また、呼び出し部材を保持する既存の保持部材に支持部材を加えた簡単、かつ安価な構成でジャム紙を除去することができる。

【0047】また、本体カバーと保持部材を連結する連結部材を設け、本体カバーの開放時に、連結部材を介して保持部材を解除位置に移動させるようにしたため、本体カバーの開放動作に伴って分離手段および搬送手段の加圧を解除することができ、より簡単な操作でジャム紙を除去することができる。

【図面の簡単な説明】

【図１】本発明に係る自動原稿搬送装置の一実施形態を示す図であり、その概略構成図である。

【図２】一実施形態の本体カバーを閉塞したときの分離

手段および搬送手段の概略図である。

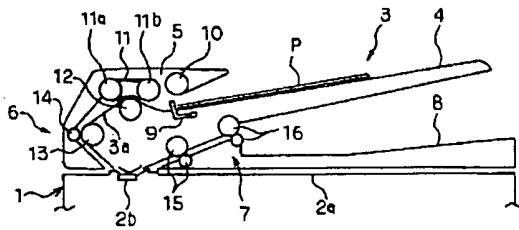
【図３】（a）は一実施形態の本体カバーを開放したときの分離手段および搬送手段の概略図、（b）は支持部材を加圧するコイルばねの構成図である。

【図４】一実施形態のジャム紙を除去する手順を示す図である。

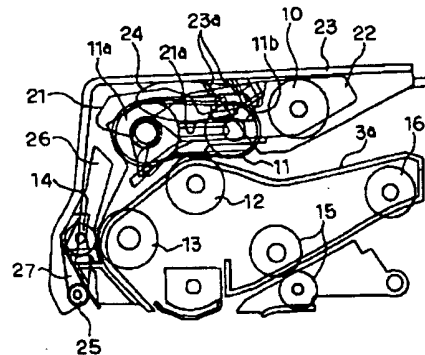
【符号の説明】

- 3 自動原稿搬送装置
- 4 原稿トレイ（原稿載置台）
- 5 分離手段
- 6 搬送手段
- 10 呼び出しコロ（呼び出し部材、分離ユニット）
- 11 給紙ベルト（分離ユニット）
- 12 分離コロ（分離ユニット）
- 13 駆動ローラ
- 14 従動ローラ
- 21 ベルトホルダー（分離ユニット）
- 22 保持部材（分離ユニット）
- 24 バンド部材（連結部材）
- 26 支持部材
- 27 コイルばね（付勢部材）

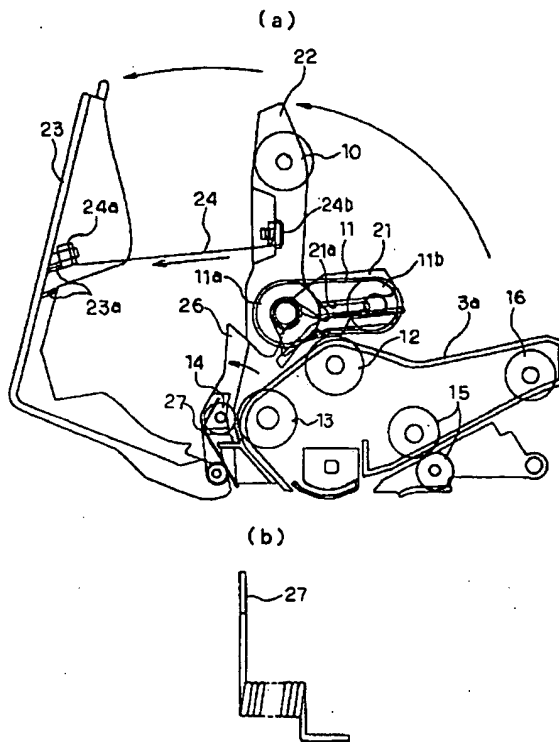
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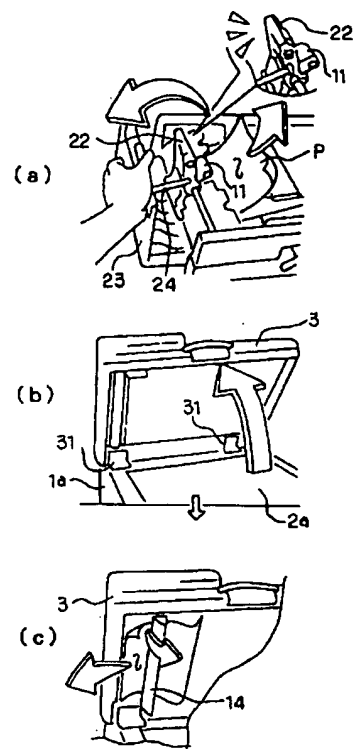
【図２】



【図3】



【図4】



フロントページの続き

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BA52
3F049 CA01 CA33 DA12 DB02 DB04
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3F343 FA03 FB02 FB03 FC01 FC05
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HA12 JA35 JD04 JD10 JD33
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